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INFORMATION ON YUGOSLAV RAILROADS

This report gives various data on Yugoslav railroad yard workshops and personnel, marking of freight and passenger cars, overhaul of cars, specifications of a new-type long mail car, and organization of the rail maintenance service. It also includes tables showing upgrades and downgrades of railroad sections and the relation between weight of load and locomotive speed.

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Workshops in Railroad Yards

All railroad yards are equipped to make current, minor, and periodic repairs of locomotives and cars in their workshops. Ordinary tools, such as ordinary lathes, shapers, planes, drills, whetstones and polishers, lathes for turning wheels, and mechanics' hammers, are supplied for these yards.

Special tools, such as special polishers, revolving lathes, etc., are not usually supplied, for they would not be used sufficiently. Lathes for turning wheels are usually provided to make possible the rapid repair of locomotive and railroad car wheels and to avoid the expense of assigning their repair to the main workshop. An exception is made for smaller yards, which send their wheels to neighboring workshops for repair.

The number of tools necessary for the completion of periodic, minor, and current repairs depends on the number of locomotives in operation, the intensiveness of their use, the types of locomotives, and the kinds of tools.

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Estimates are based on what is considered particularly necessary for the maintenance of locomotives, cars, and periodic repairs. These estimates are figured on the basis of normal work performance (number of hours required for processing by particular machine tools), on the specific series of locomotives, and on the specific types of repairs.

The original Serbo-Croatian document carried the following comment on the above information: "The source is completely new and this is one of the first of his reports; it is, therefore, a general one. However, details and concrete data concerning transportation are being sought, and the source will attempt to report on the functions of the General Directorate of Railroad Yards at Zagreb."

Estimate of Numerical Strength of Personnel of Railroad Yards

The number of personnel in railroad yards depends on the equipment and the size of the yard. The personnel from one or more yards, or the whole directorate, falls into the following groups:

Engineers, technical white-collar workers, superintendents, and auxiliary technical personnel who constitute the management staff

Locomotive supervisors (yard and traveling)

Administrative personnel (except for warehouses)

Administrative personnel for warehouse material (except delivery and inventory)

Machinists

Firemen

Car inspectors

Car greasers

Workers for repair and maintenance of locomotives (current and minor repairs)

Workers for repair and maintenance of railroad cars (current repairs that do not require uncoupling of cars)

Workers for periodic repair of locomotives

Workers for repair and maintenance of yard equipment

Workers for getting locomotives ready and for maintenance of yard area

Workers for cleaning and getting cars ready

Other personnel

Marking of Cars With Reference to Brakes

All cars are equipped with complete air brakes or with lines for air brakes. In the car depot, there are no longer three groups of cars of the same series, marked G, Gv, and Gc or K, Kv, and Kc, but only two groups, marked Gv and Gc or Kv and Kc.

To distinguish between the two groups, it is no longer necessary to use two subseries letters like "v" and "c", but only one. The larger group is not marked with any subseries letter, while the smaller group is marked with one subseries letter. For instance, there are more cars equipped with lines for air brakes than there are cars with complete air brakes. Therefore, the cars equipped with lines for air brakes will not be marked with any subseries letter, while the cars with complete air brakes will be marked with the subseries letter "v".

The same reasoning is to be applied to the marking of passenger cars with reference to the location of the corridor, on the side or in the center, marked Cs and Ch. These two subseries are no longer necessary. Only one subseries letter is needed for the smaller group, the marking then being C and Ch.

Marking of Freight Cars With Reference to Weight of Freight and Capacity of Car

According to former regulations, all freight cars had to be marked with figures indicating the weight of freight carried and the capacity of the car carrying it; the first figure indicated weight of load, and the second, the capacity of the car, e.g., 15,000/15,750.

Because the capacity of all cars is normally 5 percent more than the freight load, these regulations have been changed. Wherever the car capacity is 5 percent greater than the freight load, only the load is indicated. Where the car capacity is more or less than 5 percent greater than the load, both are indicated.

Marking of the Last Car of a Train

Current regulations provide that only a signal lantern or signal disk is needed to mark the last car of a train. Angular signals may be placed on the last cars which use hand-operated brakes, as was ordered for all cars in 1949.

All boxcars of German type (reparations and war booty) were provided with four steps on the tail end, two brackets for the angular signals, and two hand grips, whether they used hand-operated brakes or not. Tito ruled that these were not necessary on cars which did not use hand-operated brakes. As a result, one hand grip, the brackets for the angular signals, and two steps were removed from each boxcar of German type which does not use hand-operated brakes.

Overhaul and Rebuilding of Railroad Cars, Series "J"

Yugoslav railroads had a number of cars with welded sides labeled series "Jz," "Jrz," and "Jrdz." These cars were not properly in series "J," for the main characteristic of cars in this series is that they have removable sides. As a result, all cars with the above markings were overhauled in 1949 and rebuilt so that the sides could be removed. Where rebuilding was impossible, the cars were removed from series "J" and marked "K" or "Kd".

Cars in series "J," "Jr," and "Jrd" were found to have very poorly constructed doors, which bent under weight, and through which fine material, such as fine coal, sifted. Such poorly constructed doors are easily damaged and need repair at every periodic checkup. Therefore, in 1949 orders were given to each yard to rebuild or repair the doors of these cars, adapting them to the type of car in series "Jr," formerly "Kk" STB, or to the type currently known as CSD "Jrd" cars, with strong binding.

Overhaul of Cars With Conduits for Steam Heat

A large number of cars provided with conduits for steam heat and considerably more than were necessary were in the car park (Series Gg, Gvg, Gcg, Gzvg, Gkvg, etc.).

An overhaul of these cars was completed in 1949, and only that number was retained which was absolutely necessary. The conduits were removed from the other cars to save time and materials when periodic checkups or repairs are made.

Precedence was given to dismantling conduits for steam heat in cars which have only the lines for air brakes (Gcg, Gzcg, etc.).

Conduits for steam heat were removed from all "N" cars, as Tito did not consider them necessary.

New Type Long Mail Cars

After a series of short-type mail cars, the car factory in Jasenica recently built a new type of long mail car with all-steel body. The first cars are prototypes of a larger series, which are in process of being built.

This car is not only the longest in the Yugoslav car park, but one of the longest steel cars of its kind in Southeast Europe. The cars are the first built in this country with a streamlined design.

Main dimensions and characteristics of the cars are as follows (in millimeters unless otherwise indicated):

Total length between buffers	22,650
Length of car body	21,350
Truck centers	15,100
Over-all length of truck	2,500
Length of mail compartment	9,295
Width of mail compartment	2,752
Length of dressing room	1,700
Width of dressing room	1,900
Length of parcel post compartment	9,150
Width of parcel post compartment	2,752
Length of /wa ter/ closet compartment	1,700
Width of closet compartment	822
Length of cupboard for dressing room	1,100
Width of cupboard for dressing room	300
Exterior width of car in center	2,930
Exterior width of car in front	2,850
Thickness of side and front walls	70
Thickness of closet and partition walls	30
Width of braking compartment	615
Length of braking compartment	2,681
Height of floor	1,240
Height from top of rail to roof	3,940
Clear height of body	3,380
Clear height of compartment for parcels and mail	2,450
Net weight of car (kg)	38,000
Approximate weight of trestle (kg)	10,000
Highest permissible speed (kg/hr)	120
Weight on each axle (kg)	12,000
Number of beds (units)	2
Number of chairs (units)	5

The materials, parts, and equipment of these cars fulfill particular specifications for material. All elements of the framework for roof construction, car body, and truck are made of quality 37, i.e., a tensile strength of 37 kilograms per square millimeter.

Organization of Rail Maintenance Service

Chief, Rail Maintenance Service

Assistant Chief, Rail Maintenance Service

Administrative staff

Operations

Group for track maintenance
Group for roadbed maintenance
Group for building maintenance
Operational bookkeeping group and planning group for lowering costs
Group for agricultural works [draining roadbeds?]
Group for technical record office

Capital investment and operation

Group for capital improvement of tracks, roadbeds, and buildings
Group for confiscation

Procurement and production group

Group for procurement
Group for production (stone, gravel, etc.)

Table Showing Classification of Railroad Sectors According to Average Degree of Upgrade or Downgrade

RR Sector No	Av Upgrade or Downgrade (m/1,000 m)	RR Sector No	Av Upgrade or Downgrade (m/1,000 m)
I	to 1	XII	11-12
II	1-2	XIII	12-13
III	2-3	XIV	13-14
IV	3-4	XV	14-15
V	4-5	XVI	15-16
VI	5-6	XVII	16-17
VII	6-7	XVIII	17-18
VIII	7-8	XIX	18-19
IX	8-9	XX	19-20
X	9-10	XXI	20-21
XI	10-11	XXII	21-22

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RR Sector No	Av Upgrade or Downgrade (m/1,000 m)	RR Sector No	Av Upgrade or Downgrade (m/1,000 m)
XXIII	22-23	XXVII	26-27
XXIV	23-24	XXVIII	27-28
XXV	24-25	XXIX	28-29
XXVI	25-26	XXX	29-30

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Table Showing Upgrades and Downgrades of Railroad Sectors

Av Upgrade for Braking	Av Downgrade for Braking	[Not specified; possibly ruling grade in m/1,000 m]	RR Sector No	Direction	Division	Direction	RR Sector No	[Not specified; possibly ruling grade in m/1,000 m]	Av Upgrade for Braking	Av Downgrade for Braking
1	2	3	4	5	6	7	8	9	10	11
					[Segment of] Belgrade-Djevdjelija-Belgrade Line					
-	-	-	-	↓	Belgrade	↑	III	3.	2.	
4.	2.	5.	V		Topcider		Vp*	2.	0.5	5.
5.	0.5	7.	VII		Resnik		IXp	0.5	0.	9.
9.	0.	10.	X		Ripanj		VIIIp	2.5	0.	8.
8.	0.	11.5	XII		Klenje		XIIp	3.	0.	12.
12.	0.	13.5	XIV		Ripanj tunnel		XIV	14.	12.	12.
12.	12.	14.	XIV		Ralja		XIV	13.5	12.	0.
0.	12.	11.55	XIIp*		Djurinci		V	5.	4.	1.
1.	4.	2.	II		Vlasko Polje		VII	6.7	5.5	2.
2.	5.5	3.	VIp		Mladenovac		V	5.	4.5	0.5
0.5	4.5	1.	Vp		Kovacevac		VI	5.5	4.5	3.
3.	4.5	4.5	V		Kusadak		V	4.5	4.	1.5
1.5	4.	2.5	III		Glibovac		II	2.	1.	2.5
2.5	1.	3.	III		Palanka		IX	9.	7.	7.

*[Possibly an abbreviation for pad (downgrade)?]

(Contd)

Av Upgrade for Braking	Av Downgrade for Braking	[Not specified; possibly ruling grade in m/1,000 m]	RR Sector No	Direction	Division	Direction	RR Sector No	[Not specified; possibly ruling grade in m/1,000 m]	Av Upgrade for Braking	Av Downgrade for Braking
1	2	3	4	5	6	7	8	9	10	11
					[Segment of] Gyekenyes, Hungary-Zagreb Main Station-Susak-Gyekenyes Line					
7.	0.	8.5	IX	↓	Vrbovsko	↑	VIIp	0.	0.	7.
7.	0.	8.	VIII		Srpska Moravice		XVIIIp	2.5	0.	18.
18.	0.	20.	XX		Brod Moravice		XVIIIp	3.	0.	18.
18.	0.	19.5	XX		Skrad		XVIp	4.5	2.5	16.
16.	2.5	19.5	XX		Susica		II	1.5	0.	0.
0.	0.	1.5	II		Delnice		XVIp	4.	0.	16.
16.	0.	20.	XX		Lokve		XXVIII	28.	25.	16.
16.	25.	19.	XXVp		Fuzine		XVIp	3.5	0.	16.
16.	0.	20.	XX		Lic		XXX	29.5	25.	0.
0.	25.	2.5	XXVp		Plase Crikven		XXX	30.	25.	0.
0.	25.	4.	XXVp		Meja		XXX	29.6	25.	0.

Maximum Permissible Load on Railroad Trains Expressed in Tons

The following table gives maximum permissible load on railroad trains expressed in tons considering the maximum permissible strain on brake installations on upgrades, i.e., the maximum pulling power of 12,500 kilograms, and considering safety of braking by hand-operated brakes on downgrades.

RR Sector No	Maximum Permissible Load, in Tons, in Cases Where One or Two Locomotives Are Used			
	For Express and Passenger Trains		For Freight Trains	
	Upgrade	Downgrade	Upgrade	Downgrade
I	1,600	1,600	2,300	2,300
II	1,500	1,500	2,000	2,000
III	1,400	1,500	2,000	2,000
IV	1,300	1,500	1,800	2,000
V	1,200	1,400	1,600	1,900
VI	1,120	1,400	1,400	1,900
VII	1,060	1,300	1,300	1,800
VIII	1,000	1,300	1,200	1,800
IX	950	1,200	1,100	1,700
X	900	1,100	1,100	1,600
XI	850	1,000	925	1,450
XII	800	900	850	1,300
XIII	750	850	800	1,200
XIV	700	800	750	1,100
XV	665	775	710	1,025
XVI	630	750	670	950
XVII	600	700	635	900
XVIII	570	660	600	850
XIX	545	630	575	800
XX	520	600	550	750
XXI	495	580	525	720
XXII	470	560	500	690
XXIII	450	540	480	660

RR Sector No	For Express and Passenger Trains		For Freight Trains	
	Upgrade	Downgrade	Upgrade	Downgrade
XXIV	430	520	460	630
XXV	415	500	445	600
XXVI	400	-	430	-
XXVII	385	-	415	-
XXVIII	370	-	400	-
XXIX	360	-	390	-
XXX	350	-	380	-

Relation Between Weight of Load [in tons] and Basic Speed of Locomotives, Series No 07-56.14

RR Sector No	Basic Speed [km/hr]								
	20	25	30	35	40	45	50	60	70
I	3,260	3,060	2,600	2,120	2,070	1,670	1,500	1,040	740
II	2,800	2,630	2,280	1,950	1,700	1,480	1,320	950	700
III	2,340	2,260	1,960	1,680	1,470	1,290	1,140	860	660
IV	1,960	1,960	1,680	1,440	1,300	1,160	1,040	790	620
V	1,720	1,720	1,500	1,340	1,160	1,040	950	745	590
VI	1,490	1,490	1,360	1,220	1,080	960	890	710	570
VII	1,300	1,300	1,240	1,120	1,000	900	830	675	555
VIII	1,180	1,180	1,130	1,040	940	840	780	640	540
IX	1,070	1,070	1,030	970	880	790	730	610	520
X	960	960	960	910	840	760	700	590	510
XI	890	890	890	855	800	730	670	570	500
XII	820	820	820	800	760	700	640	550	485
XIII	765	765	765	750	720	670	615	535	475
XIV	710	710	710	700	680	640	590	520	500
XV	665	665	665	665	645	615	570	505	450
XVI	620	620	620	620	610	590	550	490	435
XVII	585	585	585	585	585	560	530	475	425
XVIII	550	550	550	550	550	540	510	460	410

Basic Speed (km/hr)

HR Sector No	20	25	30	35	40	45	50	60	70
XIX	520	520	520	520	520	520	490	445	400
XX	490	490	490	490	490	490	470	430	390
XXI	465	465	465	465	465	465	450	415	380
XXII	440	440	440	440	440	440	430	400	370
XXIII	420	420	420	420	420	420	415	390	360
XXIV	400	400	400	400	400	400	400	375	350
XXV	385	385	385	385	385	385	385	365	340
XXVI	370	370	370	370	370	370	370	350	330
XXVII	355	355	355	355	355	355	355	340	320
XXVIII	340	340	340	340	340	340	340	325	310
XXIX	325	325	325	325	325	325	325	315	300
XXX	310	310	310	310	310	310	310	300	290

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